

AMENDMENTS TO THE CLAIMS

1-8. (Cancelled)

9. (Previously Presented) An electrolytic processing apparatus comprising an electrode member, said electrode member comprising an electrode and an ion exchanger covering a surface of the electrode, wherein a contact width restriction section is provided in said electrode member for restricting a substantial contact width between a workpiece and such a portion of the ion exchanger as usable in processing to a constant width when the workpiece is brought into contact with the ion exchanger of said electrode member to a certain extent of pressing or higher.

10. (Previously Presented) The electrolytic processing apparatus according to claim 9, wherein the contact width restriction section is comprised of an insulating film attached to a front surface side or a back surface side of the ion exchanger.

11. (Original) The electrolytic processing apparatus according to claim 9, wherein the contact width restriction section is comprised of a member having no ion exchange ability.

12. (Original) The electrolytic processing apparatus according to claim 11, wherein the member having no ion exchange ability is formed integrally with the ion exchanger.

13. (Original) The electrolytic processing apparatus according to claim 9, wherein the contact width restriction section is comprised of a convex portion provided in the ion exchanger.

14. (Original) The electrolytic processing apparatus according to claim 9, wherein a plurality of said electrode members are disposed in parallel.

15. (Previously Presented) The electrolytic processing apparatus according to claim 14, wherein the electrodes of adjacent electrode members are connected alternately to a cathode and to an anode of a power source.

16-22. (Cancelled)

23. (Previously Presented) An electrolytic processing method for electrolytically processing a surface of a workpiece, comprising:

bringing the workpiece into contact with a processing electrode, the processing electrode having an ion exchanger disposed on a surface of the processing electrode and having a narrower width than the workpiece; and

processing the surface of the workpiece while allowing the processing electrode and the workpiece to make a relative movement,

wherein a substantial contact width between the workpiece and such a portion of the ion exchanger as used in processing is kept constant during the processing.

24. (Previously Presented) The electrolytic processing method according to claim 23, wherein at least a portion of the ion exchanger exposed on the surface of the processing electrode is brought into a substantial contact with the workpiece over a full width of the exposed portion.

25. (Previously Presented) An electrolytic processing method, comprising:

bringing a workpiece close to or into contact with a processing electrode;

applying a voltage between the processing electrode and a feeding electrode that feeds electricity to the workpiece;

supplying a fluid between the workpiece and at least one of the processing electrode and the feeding electrode; and

processing a surface of the workpiece while allowing the processing electrode and the workpiece to make a first relative movement, which is a relative reciprocating movement in a first direction, and, at the same time, allowing the workpiece and the processing electrode to make a second relative movement, which is a relative movement in the first direction for a distance corresponding to an integral multiple of a pitch as determined in a processing amount distribution of the workpiece in the first direction, obtained in the first relative movement.

26. (Previously Presented) The electrolytic processing method according to claim 25, wherein a speed of the first relative movement is changed.

27. (Previously Presented) The electrolytic processing method according to claim 25, wherein the processing electrode is comprised of a plurality of electrode members disposed in parallel, each electrode member comprising an electrode and an ion exchanger covering a surface of the electrode.

28. (Original) The electrolytic processing method according to claim 25, wherein the second relative movement is a reciprocating movement.

29. (Previously Presented) The electrolytic processing method according to claim 28, wherein the moving distance in the reciprocating movement of the second relative movement differs between a forward movement and a backward movement.

30. (Previously Presented) The electrolytic processing method according to claim 28, wherein the second relative movement is repeated, and the moving direction of the workpiece in the second relative movement is changed with the movement in the first direction in the second relative movement as a unit.

31. (Previously Presented) The electrolytic processing method according to claim 25, wherein at least one of the voltage and an electric current applied between the processing electrode and the feeding electrode is changed during electrolytic processing.

32. (Previously Presented) The electrolytic processing method according to claim 25, wherein a speed of the second relative movement is changed during electrolytic processing.

33. (Previously Presented) An electrolytic processing method, comprising:
bringing a workpiece close to or into contact with a processing electrode;

applying a voltage between the processing electrode and a feeding electrode that feeds electricity to the workpiece;

supplying a fluid between the workpiece and at least one of the processing electrode and the feeding electrode; and

processing a surface of the workpiece while allowing the processing electrode and the workpiece to make a first relative movement and, at the same time, allowing the workpiece and the processing electrode to make a second relative movement in a first direction, wherein the second relative movement is repeated, and a moving direction of the workpiece in the second relative movement is changed with the movement in the first direction in the second relative movement as a unit.

34. (Previously Presented) The electrolytic processing method according to claim 33, wherein a speed of the first relative movement is changed.

35. (Original) The electrolytic processing method according to claim 33, wherein the workpiece is rotated through a predetermined rotational angle so as to change the moving direction of the workpiece in the second relative movement.

36. (Original) The electrolytic processing method according to claim 35, wherein the rotation of predetermined rotational angle is repeated so that the workpiece makes at least one revolution until completion of the electrolytic processing of the workpiece.

37. (Previously Presented) The electrolytic processing method according to claim 33, wherein a position of the workpiece relative to the processing electrode in the second relative movement is changed with the movement in the first direction in the second relative movement as a unit.

38. (Original) The electrolytic processing method according to claim 33, wherein the workpiece is not rotated during the second relative movement.

39. (Previously Presented) The electrolytic processing method according to claim 33, wherein at least one of the voltage and an electric current applied between the processing electrode and the feeding electrode is changed during electrolytic processing.

40. (Previously Presented) The electrolytic processing method according to claim 33, wherein a speed of the second relative movement is changed during electrolytic processing.

41. (Previously Presented) An electrolytic processing apparatus, comprising:
a processing electrode that can come close to or into contact with a workpiece;
a feeding electrode for feeding electricity to the workpiece;
a holder for holding the workpiece and bringing the workpiece close to or into contact with the processing electrode;
a plurality of ion exchangers disposed between the workpiece and at least one of the processing electrode and the feeding electrode; and
a feed mechanism for feeding and changing at least one ion exchanger of the plurality of ion exchangers.

42. (Previously Presented) The electrolytic processing apparatus according to claim 41, wherein a plurality of feed mechanisms is provided for the plurality of ion exchangers, respectively.

43. (Previously Presented) The electrolytic processing apparatus according to claim 41, wherein a change cycle of an ion exchanger that does not come close to or into contact with the workpiece is shorter than a change cycle of an ion exchanger that comes close to or into contact with the workpiece.

44. (Original) The electrolytic processing apparatus according to claim 43, wherein the ion exchanger that does not come close to or into contact with the workpiece is changed by the feed mechanism.

45. (Previously Presented) The electrolytic processing apparatus according to claim 41, wherein of the plurality of ion exchangers, a change cycle of an ion exchanger having a large ion exchange capacity is shorter than a change cycle of another of the ion exchangers.

46. (Previously Presented) The electrolytic processing apparatus according to claim 41, wherein the changing of the at least one of the ion exchangers is carried out during electrolytic processing.

47. (Original) The electrolytic processing apparatus according to claim 41, including:
a plurality of rotatable members; and
a plurality of intervening members intervening between the rotatable members,
wherein the ion exchangers are disposed such that they thread between the rotatable members and the intervening members.

48. (Previously Presented) The electrolytic processing apparatus according to claim 47, wherein one of the rotatable members is at least one of the processing electrode and the feeding electrode.

49. (Previously Presented) The electrolytic processing apparatus according to claim 41, further comprising:
a regeneration device for regenerating the at least one ion exchanger that is circulated by the feed mechanism.

50. (Previously Presented) An electrolytic processing apparatus, comprising:
a processing electrode that can come close to or into contact with a workpiece;
a feeding electrode for feeding electricity to the workpiece;
a holder for holding the workpiece and bringing the workpiece close to or into contact with the processing electrode;
an ion exchanger disposed between the workpiece and at least one of the processing

electrode and the feeding electrode;

a water-permeable member superimposed on a surface of the ion exchanger; and

a feed mechanism for feeding and changing the ion exchanger.

51. (Previously Presented) The electrolytic processing apparatus according to claim 50, wherein a change cycle of the ion exchanger is shorter than a change cycle of the water-permeable member.

52. (Original) The electrolytic processing apparatus according to claim 50, including:

a plurality of rotatable members; and

a plurality of intervening members intervening between the rotatable members,

wherein the ion exchanger is disposed such that it threads between the rotatable members and the intervening members.

53. (Previously Presented) The electrolytic processing apparatus according to claim 52, wherein one of the rotatable members is at least one of the processing electrode and the feeding electrode.

54. (Original) The electrolytic processing apparatus according to claim 50, further comprising:

a regeneration device for regenerating the ion exchanger that is circulated by the feed mechanism.

55. (Original) An electrolytic processing apparatus, comprising:

a processing electrode that can come close to or into contact with a workpiece;

a feeding electrode for feeding electricity to the workpiece; and

a holder for holding the workpiece and bringing the workpiece close to or into contact with the processing electrode,

wherein the processing electrode or the feeding electrode is comprised of a plurality of

electrodes, and the respective electrodes can move close to or apart from the workpiece independently.

56. (Original) The electrolytic processing apparatus according to claim 55, wherein an ion exchanger is disposed between the workpiece and at least one of the processing electrode and the feeding electrode.

57. (Previously Presented) A substrate holder for holding a substrate and bringing the substrate into contact with a processing electrode to carry out electrolytic processing of the substrate, comprising:

- a flange portion connected to a shaft; and
- a chucking member which can move with respect to the flange portion in an axial direction of the shaft and which holds the substrate.

58. (Original) The substrate holder according to claim 57, further comprising:
a first pressure chamber formed between the flange portion and the chucking member, wherein a fluid is supplied to the first pressure chamber to pressurize the first pressure chamber, thereby bringing the substrate held by the chucking member into contact with the processing electrode.

59. (Original) The substrate holder according to claim 58, wherein the first pressure chamber is defined by the flange portion, the chucking member, and an elastic member linking the flange portion and the chucking member.

60. (Previously Presented) The substrate holder according to claim 57, wherein a weight of a predetermined weight is attached to the chucking member to adjust a pressure applied to the processing electrode by the substrate.

61. (Original) The substrate holder according to claim 57, further comprising:

an air cylinder for pressing the chucking member downward.

62. (Original) The substrate holder according to claim 57, the chucking member including:

- a chucking plate having a through-hole communicating with the substrate;
- a stopper plate provided above the chucking plate; and
- a second pressure chamber formed between the chucking plate and the stopper plate, wherein the second pressure chamber is depressurized by drawing a fluid from the second pressure chamber, thereby attracting the substrate to the chucking member.

63. (Previously Presented) The substrate holder according to claim 57, wherein a retainer ring having an inward-protruding portion is mounted to the flange portion, and a protrusion for engaging the protruding portion of the retainer ring is provided in the chucking member.

64. (Previously Presented) An electrolytic processing apparatus, comprising:

- a processing electrode;
- a feeding electrode for feeding electricity to a substrate;
- a substrate holder for holding the substrate and bringing the substrate into contact with the processing electrode;
- a power source for applying a voltage between the processing electrode and the feeding electrode; and
- a drive section for allowing the substrate held by the substrate holder and the processing electrode to make a relative movement,

wherein the substrate holder is a substrate holder for holding the substrate and bringing the substrate into contact with the processing electrode to carry out electrolytic processing of the substrate and includes

- a flange portion connected to a shaft, and
- a chucking member which can move with respect to the flange portion in an axial

direction of the shaft and which holds the substrate.

65. (Original) The electrolytic processing apparatus according to claim 64, wherein an ion exchanger is disposed between the substrate and at least one of the processing electrode and the feeding electrode.

66. (Original) The electrolytic processing apparatus according to claim 65, further comprising:

a fluid supply section for supplying a fluid between the substrate and at least one of the processing electrode and the feeding electrode in which the ion exchanger is disposed.

67. (Original) The electrolytic processing apparatus according to claim 64, wherein a water-permeable member is disposed between the substrate and at least one of the processing electrode and the feeding electrode.

68. (Previously Presented) An electrolytic processing method, comprising:
providing a processing electrode and a feeding electrode;
applying a voltage between the processing electrode and the feeding electrode;
holding a substrate by a substrate holder, the substrate holder including a flange portion connected a shaft and a chucking member for holding the substrate; and
allowing the substrate to be in contact with the processing electrode while allowing the substrate and the processing electrode to make a relative movement, thereby processing the surface of the substrate.

69. (Original) The electrolytic processing method according to claim 68, including:
supplying a fluid to a first pressure chamber formed between the flange portion and the chucking member of the substrate holder to pressurize the first pressure chamber, thereby bringing the substrate held by the chucking member into contact with the processing electrode.

70. (Original) The electrolytic processing method according to claim 68, wherein an ion exchanger is disposed between the substrate and at least one of the processing electrode and the feeding electrode.

71. (Previously Presented) The electrolytic processing method according to claim 69, wherein a pressure of the fluid supplied to the first pressure chamber is adjusted so that a pressure applied to the substrate becomes not more than 6.86 kPa.

72-84. (Cancelled)